

REMARKS

The Final Office Action dated February 25, 2010, and the references cited therein, have been considered. Claims 1-28 were previously pending. Claims 16-26 have been canceled. New claims 29 and 30 have been added. No claims currently stand allowed. Applicants traverse each of the previous rejections for the reasons set forth herein.

Applicants have amended several of the presently pending claims to emphasize the physical nature of the recited "plurality of physically separate intersubnetwork connections." Applicants have also amended claim 14 to address the Section 112, paragraph 2 rejection of claim 14 as being indefinite for failing to particularly point out and distinctly claim the invention. The amended claim 14 remedies the lack of antecedent basis grounds for rejecting claim 14 in the Final Office Action. New claims 29 and 30 combine the transmit/receive functionality of claims 1 and 2. Claim 30 specifically recites a two separate subnetworks connected by a plurality of physically separate subnetwork connections.

Applicants request favorable reconsideration of the grounds for the rejection of the previously pending claims, in view of Applicants' amendments and accompanying remarks. Please charge any fee deficiencies to Deposit Account No. 12-1216.

Summary of Prior Art-Based Rejections

1. Claims 1-2, 5, 7, 9 and 12-15 were rejected as obvious under 35 U.S.C. Section 103(a) over Roberts US Pat. No. 6,959,019 (Roberts) in view of Mueller US Pat. No. 7,068,687 (Mueller).

2. Claims 3-4 and 8 were rejected as obvious under 35 U.S.C. Section 103(a) over Roberts in view of Mueller and Ferguson US App. Pub. No. 2002/0041604 (Ferguson).

3. Claim 6 was rejected as obvious under 35 U.S.C. Section 103(a) over Mueller and Roberts in view of Okumura US App. Pub. No. 2006/0007950 (Okumura).

4. Claim 10 was rejected as obvious under 35 U.S.C. Section 103(a) over Roberts and Mueller in view of Kubo US Pat. No. 7,440,475 (Kubo).

5. Claims 27 and 28 are rejected as obvious under 35 U.S.C. Section 103(a) over Mueller and Roberts in view of O'Dell US Pat. No. 6,891,825 (O'Dell).

Applicants traverse each of the above-summarized current grounds for rejection set forth in the Office Action.

*Applicants' Remarks Addressing the Specific Grounds for the Rejections**1. Rejection of Claim 14 as being indefinite*

Applicants have amended claim 14 to address the lack of antecedent basis rejection raised in the Final Office Action.

2. Rejection of Claims 1-2, 7 and 12-15 as obvious over Roberts in view of Mueller

Applicants traverse the Office Action's rejection of independent claims 1 and 2 as obvious since Roberts and Mueller do not, in combination, disclose each recited element of either of these claims – **in particular the recited "physically separate intersubnetwork connections."**

Summary of Applicants' Disclosed/Claimed Invention

Applicants invention is directed to a network arrangement that utilizes inverse multiplexing (breaking up an input data signal stream) into a set of sub-streams, directing each of the sub-streams to a distinct one of a set of system multiplexers, and forwarding the sub-streams *via a plurality of physically separate intersubnetwork connections* connecting a first and second subnetwork. This physical arrangement of subnetwork components and *physically separate connections* between two subnetworks enables realization of enhanced throughput, on a temporary basis, between a node on a first subnetwork and another node on a second subnetwork. Such functionality/advantage is not even remotely contemplated by either Roberts or Mueller.

Independent Claim 1 is directed to a physical network for *producing*, from a single (original) data signal, an inverse multiplexed signal transmitted over a plurality of "physically separate intersubnetwork connections." Intersubnetwork, by definition, means "between" a first and a second subnetwork. Applicants direct attention specifically to FIG. 4 and its associated written description that unequivocally identify "a plurality of physically separate intersubnetwork connections" 301, 302 and 303 between a first subnetwork at the top of FIG. 4 and a second subnetwork at the bottom of FIG. 4. *See*, Applicants' Specification, page 14, lines 9-13. The "physically separate intersubnetwork connections" (e.g., 301, 302 and 303) *between*

differing subnetworks are distinguished from "intrasubnetwork" connections (e.g., 130/131 and 230/231) *within a same subnetwork*. See, Applicants' Specification, page 14, lines 21-26. Thus, Applicants' specification and claims clearly define/distinguish *inter*- and *intra*- subnetwork connections as well as the physical nature of the connections (as opposed to a logical/non-physical connection).

Applicants' disclosed/claimed invention is directed to a physical network configuration that enables using physically separate neighboring intersubnetwork connections to temporarily boost throughput between a particular user on a first subnetwork and a second subnetwork connected via multiple physically separate intersubnetwork connections. This functionality is not even remotely suggested by either Roberts or Mueller.

Independent Claim 2 is directed to a physical subnetwork, connected via intersubnetwork connections to another subnetwork, including particular components for *receiving* and combining a set of inverse multiplexed signals to render a single (original) data signal.

Applicants previously amended independent claims 1 and 2 to explicitly recite that the "intersubnetwork connections" are *physically separate* connections. Moreover, Applicants have previously emphasized that the system (de)mux (e.g., 212) is interposed *between* an intersubnetwork connection (e.g., 301) and an inverse (de)mux (e.g., 221). The previously clarified claims 1 and 2 (closely following the exemplary embodiment depicted in FIG. 4) contain a physical component connection including "intersubnetwork connections" that are not disclosed in the combined teachings of Roberts and Mueller.

Applicants, to ensure proper understanding of the claim terms, specifically direct attention to Applicants' definitions of the terms: multiplexer, demultiplexer, inverse multiplexer and inverse demultiplexer at page 2 of the original application. In particular, Applicants note that an inverse multiplexer in a first subnetwork takes a single (original) flow of data signals and converts the single flow into multiple output flows ("chops the original stream up"). The separate multiple output flows from the original single flow are transmitted from the first subnetwork (e.g., 2') to the second subnetwork (e.g., 1') via intersubnetwork connections (e.g., 301, 302 and 303). After being received at the second subnetwork, the multiple output flows are re-combined

(at the receiving side) by an inverse demultiplexer to render the single (original) flow of data signals.

Applicants' claimed invention is directed a set of data signal processing and routing components that, in a particular practical application, use local physical loop telephone lines from a set (plurality) of distinct homes to provide a set of temporary parallel physical intersubnetwork connections that support, on a temporary basis, broader bandwidth between: (1) providers on the telephone network side, and (2) particular homes including one or more individual end nodes. The enhanced bandwidth is achieved, on a temporary basis, by inverse multiplexing a single data signal, from the telephone network side, into multiple separate data signals, transmitting the separate signals over the network in parallel via the physically separate intersubnetwork connections (connections 301, 302 and 303 in FIG. 4), and then re-combining the separate signals back to the single data signal (by an inverse de-mux – 121 in FIG. 4) on the home network/endpoint side. **In accordance with the presently claimed invention, multiple inverse mux's (221) are each connected to multiple system (de)mux's (212), and each of the system (de)mux's (212) are coupled to a physically distinct intersubnetwork connection (301, 302, and 303) between first and second subnetworks.** *See, particularly,* Applicants' claims 1 and 2 closing sequences of "wherein" clauses.

In practical application, a set of homes are grouped together (and connected) as a subnetwork. Each one of the set of homes is equipped with a system de(mux)/inverse de(mux) arranged in a "router" package. Each home has a separate *intersubnetwork connection* to a service provider. The claimed arrangement (see, claim 2) facilitates: first, receiving a *separated* single data signal (at an aggregate high data rate) via a set of physically separate lines (into the set of homes), and second re-assembling the separated single data signal using a designated (intended endpoint) inverse demux on the home side of the set of intersubnetwork connections.

*Summary of Cited Prior Art**Roberts*

Roberts, upon which the Final Office Action primarily relies, discloses a structure for interleaving broken up pieces of a set of sub-streams and thereafter multiplexing the resulting set of interleaved sub-streams to render a single multiplexed signal containing the interleaved sub-streams. See, Roberts FIG. 3. Importantly, as unequivocally provided/depicted in FIG. 1, the structures disclosed in Roberts involve a data transmission over a *single intersubnetwork connection 6*. As such, Roberts contains only a *single multiplexer* (e.g., multiplexer 26), and a single intersubnetwork connection transports the combined signal 12 between the multiplexer 26 and demultiplexer 36.

Figure 3 of Roberts discloses a set of substreams (SS1 to SS4) that are broken up by a set of inverse multiplexers (22a-d) into four channels. The broken up substream signals are thereafter passed to channel interleavers (30a-d). Each of the four channel interleavers (30a-d) combines (i.e. interleaves) its input (via terminals a-d) from the inverse multiplexers (22a-d) into a single interleaved output stream (e.g., 34a). A *single* multiplexer 26 selectively routes input interleaved data streams (34a-d) on the four channels to a single output signal 12.

Figure 4 of Roberts shows a set of complimentary function blocks for receiving the combined output signal 12 (including all interleaved substreams) and reconstructing each substream (RS1-4) by: (1) separating the received signal 12 into (4) channels (38a-d); (2) at each deinterleaver (40a-d) de-interleaving the received data into parts of respective sub-streams; and (3) at each substream multiplexer (44a-d) multiplexing the previously broken up signal sub-streams into respective substreams (RS 1-4).

Notably absent in Roberts is any disclosure relating to a *plurality of physically separate intersubnetwork connections* between the sending (FIG. 3) and receiving (FIG.4) sides of the send/receive pair shown in FIG. 1. While multiple channel interleavers (30a-d) are disclosed in FIG. 3, the output of the interleavers is directed to a multiplexer 26 which selectively transmits its received input via a *single* output signal 12 on link 6 connecting two single nodes 4a and 4b.

Moreover, contrary to the Final Office Action's assertion (at the bottom of page 3), channel signals 34a-d merely represent a *signal* – not a plurality of *physically separate intersubnetwork connections*. In fact, all of the functionality performed by the aharmonic interleaver 8 (including the channel signals 34a-d combined by the multiplexer 26 into a single signal 12) is conceivably performed via mathematical/logical manipulation of input data signals. **In the event the rejection of each of the claims is not withdrawn, applicants specifically request identification of actual "physically separate intersubnetwork connections" as recited in independent claims 1 and 2.**

Mueller

Mueller, upon which the Office Action relies to fill the gaps in Roberts' disclosure, neither discloses nor suggests Applicants' claimed arrangement of inverse (de)multiplexers, system (de)multiplexers, and physically separate intersubnetwork connections. Mueller discloses a *single* demultiplexer (inverse mux) that separates a data signal into a set of pulse frames. The pulse frames are thereafter transmitted via a chain of repeaters to a *single* multiplexer (inverse demultiplexer) on the receiving end.

Mueller also discloses chained sets of optical repeaters that receive and regenerate the data signal transmitted via a single network connection between the single demultiplexer and single multiplexer. However, none of these repeater stages bears any relationship to the claimed invention. If anything the repeaters are sub-elements within a single physical intersubnetwork connection.

Mueller thus discloses a conventional *single* multiplexer/demultiplexer arrangement.

Roberts and Mueller Do Not Render the Claimed Invention Obvious

In contrast to the physical network recited in Applicants' claims 1 and 2, nowhere is there even a hint in Roberts of Applicants' claimed "plurality of physically separate intersubnetwork connections." Roberts' channel signals 34(a-d) between interleavers 30a-d and the multiplexer 26 are likely: (1) internal connections on a chip or other physical piece of hardware, or (2) logical constructs corresponding to program functionality. In any case, the signals 34 are clearly NOT a

plurality of *physically separate connections between a first and a second subnetwork* as required in each of the independent claims.

Instead of multiple physical connections between first and second subnetworks, Roberts discloses only a *single* physical connection (fiber optical link 6) between two nodes (4a and 4b). The *single* intersubnetwork connection disclosed in Roberts is contrary to the explicitly recited *plurality of physically separate connections (to which separate ones of a plurality of system multiplexers are connected)*.

In the event the rejections of independent claims 1 and 2 are not withdrawn, Applicants request identification of the *plurality of physically separate intersubnetwork connections*. Roberts unequivocally discloses only a *single* optical transmission line connecting a single mux/demux pair. As such, even when combined with Mueller, the claimed invention cannot even be remotely contemplated by the teachings of Roberts since there is no way to use other ones of a plurality of physically separate intersubnetwork connections to enhance throughput for a node on a first subnetwork.

Applicants therefore request reconsideration of the previous rejection of independent claims 1 and 2 and each of the presently pending dependent claims.

Applicants traverse the rejection of each of the presently pending dependent claims based upon the reasons set forth herein above regarding independent claims 1 and 2 from which each depends. Applicants address certain grounds for the rejection of the dependent claims herein below.

3. Rejection of Claims 3-4 and 8 as obvious over Roberts and Mueller in view of Ferguson

Applicants traverse the rejection of claims 3 and 4 since Ferguson, like Mueller and Roberts, discloses a *single* inverse multiplexing and demultiplexing pair. As noted previously above, the claimed invention requires a *plurality of physically separate intersubnetwork connections between first and second subnetworks*. As noted previously above, Roberts' signals 34(a-d) between the interleavers 30(a-d) and the multiplexer 26 are transmitted on a same node (4a). Moreover, Roberts specifically teaches a solution for a single HIGH SPEED (i.e., fiber

optic) physical connection between two nodes. Nowhere does Roberts even remotely contemplate replacing its high speed (internal) data connections by comparatively slow local loop telephone connections.

4. Rejection of Claim 6 as obvious over Roberts and Mueller in view of Roberts and Okumura

Applicants traverse the rejection of dependent claim 6 for at least the reasons set forth above regarding claim 1 from which claim 6 depends.

5. Rejection of Claim 10 as obvious over Roberts and Mueller in view of Kubo

Applicants traverse the rejection of dependent claim 10 for at least the reasons set forth above regarding claim 1 from which claim 10 depends.

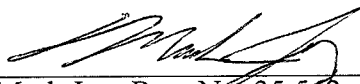
6. Rejection of Claims 27 and 28 as obvious over Roberts and Mueller in view of O'Dell

Applicants traverse the rejection of dependent claims 27 and 28 for at least the reasons set forth above regarding claims 1 and 2 from which the claims depend.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

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